Technical Specification Group Services and System Aspects
Meeting #5, Kyongju, Korea, 11-13 October 1999

TSGS#5(99)356

Source: TSG-S4 Codec Working Group

Title: 3G TS 26.101 v. 1.4.0 - AMR Speech Codec Frame Structure

Document for: Information

Agenda Item: 5.4.3

TS 26.101 V 1.4.0 (1999-09)

Technical Specification

3rd Generation Partnership Project (3GPP);
TSG-SA Codec Working Group
Mandatory Speech Codec speech processing functions;
AMR Speech Codec Frame Structure

General description

Reference

TSG-SA4-W1 (<Shortfilename>.PDF)

Keywords

Adaptive Multi-Rate, Mandatory speech coder

3GPP

Postal address

Office address

Internet

secretariat@3gpp.org

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Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project, Technical Specification Group Services and System Aspects, Working Group 4 (Codec).

The contents of this TS may be subject to continuing work within the 3GPP and may change following formal TSG-S4 approval. Should the TSG-S4 modify the contents of this TS, it will be re-released with an identifying change of release date and an increase in version number as follows:

Version m.t.e

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- m indicates [major version number]
- x the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- y the third digit is incremented when editorial only changes have been incorporated into the specification.

1 Scope

The present document outlines the frame format for all codec modes of the mandatory Adaptive Multi-Rate (AMR) speech coder.

Annex A describes an octet aligned format which shall be used when octet alignment is required.

2 Normative references

This TS incorporates by dated and undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this TS only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

[1] TS 26.090 : “AMR Speech Codec Speech Transcoding Functions".

[2] TS 26.093 : “AMR Speech Codec; Source Controlled Rate Operation".

[3] TS 26.092 : “AMR Speech Codec; Comfort Noise Aspects".

3 Definitions and abbreviations

3.1 Definitions

TX_TYPE: one of SPEECH, SID_FIRST, SID_UPD, NO_DATA (defined in [2]).

RX_TYPE: Classification of the received traffic frame (defined in [2]).

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

SCR Source Controlled Rate operation (aka source discontinuous transmission)

SID Silence Descriptor

RX Receive

TX Transmit

4 Adaptive multi rate frame format

In this section the frame format for the speech and SID frames of the Adaptive Multi-Rate speech codec [1][2] are described. This format is referred to as AMR Interface Format 1 (AMR IF1). Annex A describes AMR IF2.

Each AMR codec mode follows the generic AMR frame structure depicted in Figure 1 below. The frame is divided into three parts, the AMR header, the AMR auxillary information and the AMR core frame. The AMR header includes the Frame type and Quality Indicator fields. The AMR auxiliary information header includes the Mode Indication field and Mode Request fields and the Internal CRC[1] field. The AMR core frame part consists of the reordered speech codec parameter bits or the Comfort noise parameter bits. In the case of Comfort noise the SID payload uses Class A only.

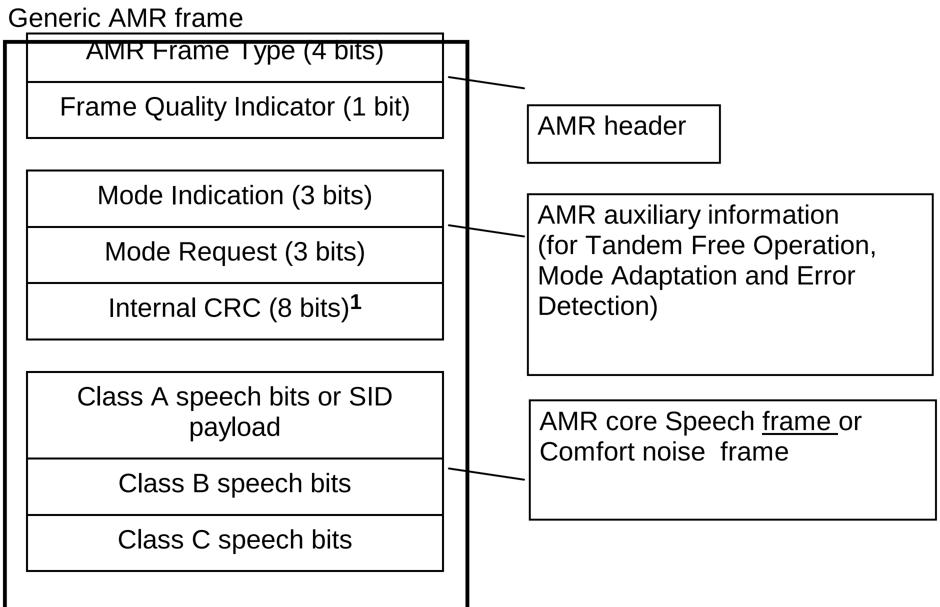

Figure 1. General frame structure

4.1 SPEECH frame

The speech coder delivers a sequence of blocks of data. One block of data corresponds to one speech frame and the block length is different in each of the codec modes. This section also describes the reordering of the speech coder output bits into three classes (Class A, B and C) according to the subjective importance of the bits.
Table 1a below defines the indicies to be used with the 4-bit AMR frame type message. The Mode Indication field and the Mode Request fields are 3-bits each and use only indicies 0…7 from this table.

[1] This field is included pending a RAN decision on transport format for speech. In case the network (RAN) can provide suitable error detection (i.e. Unequal Error Detection) this field will be removed.

Type_index	Mode
0 (Amr4-75k)	4.75 kbit/s
1 (Amr5-15k)	5.15 kbit/s
2 (Amr5-90k)	5.90 kbit/s
3 (Amr6-70k)	6.70 kbit/s (PDC-EFR)
4 (Amr7-40k)	7.40 kbit/s (IS-641)
5 (Amr7-95k)	7.95 kbit/s
6 (Amr10-2k)	10.2 kbit/s
7 (Amr12-2k)	12.2 kbit/s (GSM EFR)
8	GsmAmr Comfort Noise Frame
9	Gsm-Efr Comfort Noise Frame
10	IS-641 Comfort Noise frame
11	Pdc-Efr Comfort Noise Frame
12-14	For future use
15	No transmission/No reception

Table 1a. Definition of mode indicies

The content of the Frame Quality Indicator field is defined in Table 1b.

Quality index	Quality
0	Corrupt frame, (bits may however be used for error concealment purposes)
1	Good Frame

Table 1b. Definition of Frame Quality Indicator

TX_TYPE	Type_index	Resulting Quality Index	Comment
SPEECH	0-7	1	
SID_FIRST	8	1	SID_FIRST is encoded in the payload.
SID_UPDATE	8, 9, 10,11	1	
NO_DATA	15	1	

Table 1c. Definition of transformation of TX_TYPES [2].

Quality Index	Type_index	Resulting RX_TYPE	Comment
1	0-7	SPEECH_GOOD	
0	0-7	SPEECH_BAD	Data may be used for error concealment purposes
1	8	SID_FIRST or SID_UPDATE	SID_FIRST is encoded in the payload
0	8	SID_BAD	
1	15	NO_DATA	Typically a non-transmitted frame or an erased or stolen frame with no data useable for error concealment purposes.

Table 1d. Definition of transformation to RX_TYPES [2] **for AMR**.

4.1.1 Ordering according to subjective importance

The bits delivered by the speech encoder, {s(1),s(2),...,s(K_s)} [1], are rearranged according to subjective importance before they are sent to the RAN. Tables 4 to 10 define the correct rearrangement for the speech codec modes 12.2 kbit/s, 10.2 kbit/s, 7.95 kbit/s, 7.40 kbit/s, 6.70 kbit/s, 5.90 kbit/s, 5.15 kbit/s and 4.75 kbit/s, respectively. In the tables speech codec parameters are numbered in the order they are delivered by the corresponding speech encoder according to TS 26.090 [1] and the rearranged bits are labelled {d(0),d(1),...,d(K_d-1)}, defined in the order of decreasing importance. Index K_d refers to the number of bits delivered by the speech encoder, see Table 2 below.

The ordering algorithm is in pseudo code as:

for j = 0 to K_d-1

d(j) := s(table(j)+1); where table(j) is read line by line left to right

The rearranged bits are further divided into three classes according to subjective importance. The three classes are then subject to error protection in the network.

The protection classes are:

Class A - Data protected with the internal CRC and Error Protection scheme 1 (EP1).

Class B - Data protected with Error Protection scheme 2 (EP2).

Class C - Data protected with Error Protection scheme 3 (EP3).

The number of speech bits, class A, class B and class C bits is shown in Table 2 below.

Codec Mode	Number of speech bits delivered per block (K_d)	Number of class A bits per block	Number of class B bits per block	Number of class C bits per block
AMR12.2	244	81	103	60
AMR10.2	204	65	99	40
AMR7.95	159	75	84	0
AMR7.4	148	61	87	0
AMR6.7	134	56	78	0
AMR5.9	118	55	63	0
AMR5.15	103	49	54	0
AMR4.75	95	39	56	0

Table 2. Number of bits in different classes

4.1.2 Internal CRC for speech frames

Each codec mode uses an 8-bit internal CRC for error-detection. These eight parity bits are generated by the cyclic generator polynomial: $G(x)=D^8 + D^6 + D^5 + D^4 + 1$ from the K_{dA} bits of class A, where K_{dA} refers to number of bits in protection class A as shown below for each codec mode.

Codec mode	Frame type bits (K_{ift})	Quality Indicator bits (K_x)	Mode Indication bits (K_m)	Mode request bits (K_{mr})	CRC bits (K_{dA})	Speech Encoded bits (K_d)	After 1st enc. ($K_u = K_d + 8$)
AMR12.2	4	1	3	3	81	244	252
AMR10.2	4	1	3	3	65	204	212
AMR7.95	4	1	3	3	75	159	167
AMR7.4	4	1	3	3	61	148	156
AMR6.7	4	1	3	3	56	134	142
AMR5.9	4	1	3	3	55	118	126
AMR5.15	4	1	3	3	49	103	111
AMR4.75	4	1	3	3	39	95	103

Table 3. Number of CRC bits in each codec modes

4.1.3 Final frame structure

The frame type bits (ft(k)), frame quality bits (fq(k)), mode indication bits (m(k)), mode request bits (mr(k)), parity bits (p(k)) and information bits (d(k)) are merged to form the final frame with AMR header a(k), AMR auxiliary information b(k) and AMR core speech frame u(k). Thus the a(k), b(k) and u(k) will be defined by the following contents for each codec mode. Consequently the reverse operation is taking place at the receiving end.

a(k) = ft(k) for k = 0, 1, 2, 3 (Frame type bits)

a(k) = fq(k-4) for k = 4 (Frame Quality Indicator)

b(k) = m(k-5) for k = 5, 6, 7 (Mode indication bits)

b(k) = mr(k-8) for k = 8, 9, 10 (Mode request bits)

b(k) = p(k-11) for k = 11, 12, …, 18 (CRC bits)

u(k) = d(k) for k = 0, 1…, K_d-1 (Class A, B, C bits)

Table 4: Subjective importance of the speech encoded bits for AMR12.2

0	1	2	3	4	5	6	7	8	9
10	11	12	13	14	23	15	16	17	18
19	20	21	22	24	25	26	27	28	38
141	39	142	40	143	41	144	42	145	43
146	44	147	45	148	46	149	47	97	150
200	48	98	151	201	49	99	152	202	86
136	189	239	87	137	190	240	88	138	191
241	91	194	92	195	93	196	94	197	95
198	29	30	31	32	33	34	35	50	100
153	203	89	139	192	242	51	101	154	204
55	105	158	208	90	140	193	243	59	109
162	212	63	113	166	216	67	117	170	220
36	37	54	53	52	58	57	56	62	61
60	66	65	64	70	69	68	104	103	102
108	107	106	112	111	110	116	115	114	120
119	118	157	156	155	161	160	159	165	164
163	169	168	167	173	172	171	207	206	205
211	210	209	215	214	213	219	218	217	223
222	221	73	72	71	76	75	74	79	78
77	82	81	80	85	84	83	123	122	121
126	125	124	129	128	127	132	131	130	135
134	133	176	175	174	179	178	177	182	181
180	185	184	183	188	187	186	226	225	224
229	228	227	232	231	230	235	234	233	238
237	236	96	199						

Table 5: Subjective importance of the speech encoded bits for AMR10.2

7	6	5	4	3	2	1	0	16	15
14	13	12	11	10	9	8	26	27	28
29	30	31	115	116	117	118	119	120	72
73	161	162	65	68	69	108	111	112	154
157	158	197	200	201	32	33	121	122	74
75	163	164	66	109	155	198	19	23	21
22	18	17	20	24	25	37	36	35	34
80	79	78	77	126	125	124	123	169	168
167	166	70	67	71	113	110	114	159	156
160	202	199	203	76	165	81	82	92	91
93	83	95	85	84	94	101	102	96	104
86	103	87	97	127	128	138	137	139	129
141	131	130	140	147	148	142	150	132	149
133	143	170	171	181	180	182	172	184	174
173	183	190	191	185	193	175	192	176	186
38	39	49	48	50	40	52	42	41	51
58	59	53	61	43	60	44	54	194	179
189	196	177	195	178	187	188	151	136	146
153	134	152	135	144	145	105	90	100	107
88	106	89	98	99	62	47	57	64	45
63	46	55	56						

Table 6: Subjective importance of the speech encoded bits for AMR7.95

8	7	6	5	4	3	2	14	16	9
10	12	13	15	11	17	20	22	24	23
19	18	21	56	88	122	154	57	89	123
155	58	90	124	156	52	84	118	150	53
85	119	151	27	93	28	94	29	95	30
96	31	97	61	127	62	128	63	129	59
91	125	157	32	98	64	130	1	0	25

26	33	99	34	100	65	131	66	132	54
86	120	152	60	92	126	158	55	87	121
153	117	116	115	46	78	112	144	43	75
109	141	40	72	106	138	36	68	102	134
114	149	148	147	146	83	82	81	80	51
50	49	48	47	45	44	42	39	35	79
77	76	74	71	67	113	111	110	108	105
101	145	143	142	140	137	133	41	73	107
139	37	69	103	135	38	70	104	136	

Table 7: Subjective importance of the speech encoded bits for AMR7.4

0	1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	26	87	27
88	28	89	29	90	30	91	51	80	112
141	52	81	113	142	54	83	115	144	55
84	116	145	58	119	59	120	21	22	23
17	18	19	31	60	92	121	56	85	117
146	20	24	25	50	79	111	140	57	86
118	147	49	78	110	139	48	77	53	82
114	143	109	138	47	76	108	137	32	33
61	62	93	94	122	123	41	42	43	44
45	46	70	71	72	73	74	75	102	103
104	105	106	107	131	132	133	134	135	136
34	63	95	124	35	64	96	125	36	65
97	126	37	66	98	127	38	67	99	128
39	68	100	129	40	69	101	130		

Table 8: Subjective importance of the speech encoded bits for AMR6.7

0	1	4	3	5	6	13	7	2	8
9	11	15	12	14	10	28	82	29	83
27	81	26	80	30	84	16	55	109	56
110	31	85	57	111	48	73	102	127	32
86	51	76	105	130	52	77	106	131	58
112	33	87	19	23	53	78	107	132	21
22	18	17	20	24	25	50	75	104	129
47	72	101	126	54	79	108	133	46	71
100	125	128	103	74	49	45	70	99	124
42	67	96	121	39	64	93	118	38	63
92	117	35	60	89	114	34	59	88	113
44	69	98	123	43	68	97	122	41	66
95	120	40	65	94	119	37	62	91	116
36	61	90	115						

Table 9: Subjective importance of the speech encoded bits for AMR5.9

0	1	4	5	3	6	7	2	13	15
8	9	11	12	14	10	16	28	74	29
75	27	73	26	72	30	76	51	97	50
71	96	117	31	77	52	98	49	70	95
116	53	99	32	78	33	79	48	69	94
115	47	68	93	114	46	67	92	113	19
21	23	22	18	17	20	24	111	43	89
110	64	65	44	90	25	45	66	91	112
54	100	40	61	86	107	39	60	85	106
36	57	82	103	35	56	81	102	34	55
80	101	42	63	88	109	41	62	87	108
38	59	84	105	37	58	83	104		

Table 10: Subjective importance of the speech encoded bits for AMR5.15

7	6	5	4	3	2	1	0	15	14
13	12	11	10	9	8	23	24	25	26
27	46	65	84	45	44	43	64	63	62
83	82	81	102	101	100	42	61	80	99
28	47	66	85	18	41	60	79	98	29
48	67	17	20	22	40	59	78	97	21
30	49	68	86	19	16	87	39	38	58
57	77	35	54	73	92	76	96	95	36
55	74	93	32	51	33	52	70	71	89
90	31	50	69	88	37	56	75	94	34
53	72	91							

Table 11: Subjective importance of the speech encoded bits for AMR4.75

0	1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	23	24	25	26
27	28	48	49	61	62	82	83	47	46
45	44	81	80	79	78	17	18	20	22
77	76	75	74	29	30	43	42	41	40
38	39	16	19	21	50	51	59	60	63
64	72	73	84	85	93	94	32	33	35
36	53	54	56	57	66	67	69	70	87
88	90	91	34	55	68	89	37	58	71
92	31	52	65	86					

4.2 SID_UPDATE and SID_FIRST

In this section the frame formats for the additional types defined by the Source Controlled Rate handler [2] are described.

The AMR SID frame types are mapped to the SID transmission payload according to Table 12.

AMR TX_TYPE	Frame type bits (K_{ft})	Quality Indicator bits (K_x)	Mode Indication bits (K_m)	Mode request bits (K_{mr})	CN encoded bits (K_{CN})	SID type indicator (K_t)	CRC protected bits (K_{crc})	After 1st enc. step ($K_u = K_d + 8$) ($K_d = K_{CN} + K_t + K_m$)
SID_UPDATE or SID_FIRST	4	1	3	3	35	1	39	47

Table 12. Number of bits in SID payload frame type

4.2.1 SID frame structure

The frame type (ft(k)) and frame quality bits (fq(k)), mode indication bits (m(k)), mode request bits (mr(k)), parity bits (p(k)) and information bits (d(k)) are merged to form the final SID frame. The SID type indicator is set to 1 for SID_UPDATE and 0 for SID_FIRST. All the CN parameter bits in the payload are set to 0 if the frame is a SID_FIRST frame. The $\mathbf{K}_{CN}$ CN information bits d(k) are defined in [3].
Thus, after the first encoding step a(k), b(k) and u(k) will be defined by the following contents for each SID TX_TYPE:

SID_UPDATE:

a(k) = ft(k) for k = 0, 1, 2, 3 (Frame type bits)

a(k) = fq(k-4) for k = 4 (Frame Quality Indicator)

b(k) = m(k-5) for k = 5, 6, 7 (Mode Indication bits)

b(k) = mr(k-8) for k = 8, 9, 10 (Mode request bits)

b(k) = p(k-11) for k = 11, 12, …, 18 (CRC parity bits)

u(k) = d(k-19) for k = 19,20, …, 54 (CN parameter bits)

u(k) = 1 for k= 55 (AMR SID type indicator)

u(k) = m(k-56) for k = 56, 57, 58 (CN mode parameter bits)

SID_FIRST:

a(k) = ft(k) for k = 0, 1, 2, 3 (Frame type bits)

a(k) = fq(k-4) for k = 4 (Frame Quality Indicator)

b(k) = m(k-5) for k = 5, 6, 7 (Mode Indication bits)

b(k) = mr(k-8) for k = 8, 9, 10 (Mode request bits)

b(k) = p(k-11) for k = 11, 12, …, 18 (CRC parity bits)

u(k) = 0 for k = 19,20, …, 54 (CN parameter bits)

u(k) = 0 for k= 55 (AMR SID type indicator)

u(k) = 0 for k = 56, 57, 58 (CN mode parameter bits)

Annex A: Definition of mode signalling and bit stuffing to achieve octet alignment

This section defines the mode signalling needed for AMR use in the ITU-T H series of recommendations and the octet frame structure. This is referred to as AMR Interface Format 2 (AMR IF2). The size of the speech frames of the AMR codec in the different modes is not a multiple of eight. For that reason bit stuffing is needed to achieve octet structure. Table A.1 maps all the AMR modes into specific mode indices mi(k). Mode indicies are also reserved for Comfort Noise frames used for silence suppression in different systems. Tables A.2 to A.5 specify the frame formats for these. Table A.6 specifies a no transmission frame.

The subjective importance ordering as defined in section 4.1.1 is also applied to the octet structure. In 4.1.1 subjectively ordered bits for each codec mode are denoted d(j).

Hence the octet structure $b_n(k)$ for each AMR codec mode is defined as follows:

Number of stuffing bits: $K_s = 8*N - K_d - K_i$

Octet[0]: $b_0(k) = mi(k)$, for k = 0, 1, 2 ,3 (mode index)

$b_0(k) = d(k - 4)$, for k = 4, 5, 6, 7

Octet[n]: $b_n(k) = d(8 * n - 4 + k)$, for k = 0, 1, 2, 3, 4, 5, 6, 7

Octet[N-1]: $b_{N-1}(k) = d(8 * (N - 1) - 4 + k)$, for k = 0, …, $7 - K_s$

If $K_s > 0$

$b_{N-1}(k) = UB$, for k = $8 - K_s$, …, 7

For each codec mode the number of octets N is indicated in Table A.1.

Example A.1: Mapping of the AMR speech coding mode 6.7kbit/s.

Octet	MSB	Octet structure						LSB
b_0	d(3)	d(2)	d(1)	d(0)	0	0	1	1
b_1	d(11)	d(10)	d(9)	d(8)	d(7)	d(6)	d(5)	d(4)
b_2	…	…	…	…	…	…	…	d(12)
b_{17}	UB	UB	UB	UB	UB	UB	d(133)	d(132)

Table A.1: Mapping of the AMR speech coding modes defined in TS 26.090 to mode index bits in transmitted octets.

Mode_index (4 bits)	**Naming in TS 26.090**	**Number of octets (N)**
0 (Amr4-75k)	4.75 kbit/s mode	13 *
1 (Amr5-15k)	5.15 kbit/s mode	14 *
2 (Amr5-90k)	5.90 kbit/s mode	16 *
3 (Amr6-70k)	6.70 kbit/s mode (PDC-EFR)	18 *
4 (Amr7-40k)	7.40 kbit/s mode (IS-641)	19
5 (Amr7-95k)	7.95 kbit/s mode	21 *
6 (Amr10-2k)	10.2 kbit/s mode	26
7 (Amr12-2k)	12.2 kbit/s mode (GSM EFR)	31
8	GsmAmr Comfort Noise Frame	6 *
9	Gsm-Efr Comfort Noise Frame	6 *
10	IS-641 Comfort Noise frame	6 *
11	Pdc-Efr Comfort Noise Frame	6 *
12-14	For future use	-
15	No transmission	1

*) Bit stuffing required

Table A.2: Mapping of Comfort Noise descriptor bits from TS 26.092 to octets for the mode index 8 (Bits from s1 to s35 refer to TS 26.092)

Transmitted Octets	MSB	Mapping of bits	LSB

1	Index of 1st LSF subvector	index of LSF reference vector			Mode_Index			
	s4	s3	s2	s1	mi(3)	mi(2)	mi(1)	mi(0)
2	Index of 2nd LSF subvector	index of 1st LSF subvector						
	s12	S11	s10	s9	s8	s7	s6	s5
3	index of 2nd LSF subvector							
	s20	S19	s18	s17	s16	s15	s14	s13
4	index of 3rd LSF subvector							
	s28	s27	s26	s25	s24	s23	s22	s21
5	SID type bit	frame energy						index of 3rd LSF subvector
	t1	s35	s34	s33	s32	s31	s30	s29
6	Stuffing bits					Speech_Mode_Indication		
	UB	UB	UB	UB	UB	smi(2)	smi(1)	smi(0)

Definitions of additional descriptor bits needed for the silence descriptor in Table A.2:
SID-type (t1) is {0=SID_FIRST, 1=SID_UPDATE }
Speech Mode Indication (smi(0)- smi(2)) is the Speech Mode according to the first eight entries in the Mode_Index table.

Table A.3: Mapping of silence insertion descriptor bits from GSM 06.60 (parameters also described in GSM 06.62) to octets for the Mode Index 9 (Bits from s1 to s91 refer to GSM 06.60)

Transmitted Octets	MSB	Mapping of bits						LSB
1	Index of 1st LSF subMatrix				Mode_Index			
	s4	S3	s2	s1	mi(3)	mi(2)	mi(1)	mi(0)
2	Index of 2nd LSF submatrix					index of 1st LSF subMatrix		
	s12	s11	s10	s9	s8	s7	s6	s5
3	Index of 3rd LSF submatrix					Index of 2nd LSF submatrix		
	s20	s19	s18	s17	s16	s15	s14	s13
4	index of 4th LSF submatrix				sign of 3rd LSF submatrix	index of 3rd LSF submatrix		
	s28	s27	s26	s25	s24	s23	s22	s21
5	index of 5th LSF submatrix				index of 4th LSF submatrix			
	s36	s35	s34	s33	s32	s31	s30	s29
6	Stuffing bits	fixed codebook gain					index of 5th LSF submatrix	
	UB	S91	s90	s89	s88	s87	s38	s37

Table A.4: Mapping of silence insertion descriptor bits from IS641-A to octets, for the mode index 10 (Bits *from cn0 to cn37 refer to IS-641-A)*

Transmitted Octets	MSB	Mapping of bits						LSB
1	Index of 1st LSF subvector				Mode_Index			
	cn3	cn2	cn1	cn0	mi(3)	mi(2)	mi(1)	mi(0)
2	Index of 2nd LSF subvector				index of 1st LSF subvector			
	cn11	Cn10	cn9	cn8	cn7	cn6	cn5	cn4
3	Index of 3rd LSF subvector			Index of 2nd LSF subvector				
	cn19	cn18	cn17	cn16	cn15	cn14	cn13	cn12
4	Random Excitation Gain		index of 3rd LSF subvector					
	cn27	cn26	cn25	cn24	cn23	cn22	cn21	cn20
5	Index of 1st RESC parameter		Random Excitation Gain					
	cn35	cn34	cn33	cn32	cn31	cn30	cn29	cn28
6	Stuffing bits						Index of 2nd RESC parameter	
	UB	UB	UB	UB	UB	UB	cn37	cn36

Table A.5: Mapping of silence insertion descriptor bits from ARIB xx to octets for the mode index 11 (Bits from s1 to s35 refer to ARIB xx)

Transmitted Octets	MSB	Mapping of bits						LSB
1	index of 1st LSF subvector	index of LSF reference vector			Mode_Index			
	s4	s3	s2	s1	mi(3)	mi(2)	mi(1)	mi(0)
2	index of 2nd LSF subvector	index of 1st LSF subvector						
	s12	S11	s10	s9	s8	s7	s6	s5
3	index of 2nd LSF subvector							
	s20	S19	s18	s17	s16	s15	s14	s13
4	index of 3rd LSF subvector							
	s28	s27	s26	s25	s24	s23	s22	s21
5	SID type	frame energy						Index of 3rd LSF subvector
	t1	s35	s34	S33	s32	s31	s30	s29
6	Stuffing bits							SID type
	UB	UB	UB	UB	UB	UB	UB	t2

Definition of additional descriptor bits needed for PDC-EFR Table A.5:

SID-type is {0=POST0, 1=POST1(SID_UPDATE), 2=PRE, 3=POST1_BAD }, where LSB of SID_type is t1, and MSB of SID-type is t2.

Table A.6: The definition of the no transmission frame for the mode index 15

Transmitted Octets	MSB	Frame content					LSB
1	Stuffing bits				Mode_Index		
	UB	UB	UB	UB	mi(3)	mi(2)	mi(1)	mi(0)

History

Document history		
V. 0.0.1	April 1999	First version (TSGS4#4(99)096)
v. 1.0.0	April 1999	Changes based on TSG-S4 review
v. 1.0.1	June 1999	Appendix 1 bit ordering harmonized with section 4.1.1
v. 1.3.0	September 1999	Appendix 1 corrections and clarifications
v. 1.4.0	September 1999	Update based on TSG-S4#6 comments